

(12) UK Patent Application (19) GB (11)

2 176 671 A

(43) Application published 31 Dec 1986

(21) Application No 8613312

(22) Date of filing 2 Jun 1986

(30) Priority data

(31) 8513776 (32) 31 May 1985 (33) GB

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(51) INT CL⁴
H04N 9/74

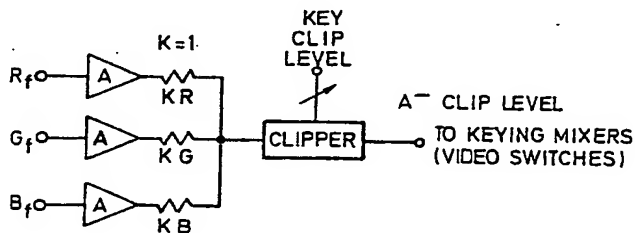
(52) Domestic classification (Edition H)
H4F D1A1 D1B1 D1B3 D1D1 D2A D30H GJ

(56) Documents cited
EP A1 0014665 US 4160994

(58) Field of search
H4F
Selected US specifications from IPC sub-class H04N

(54) Separation overlay

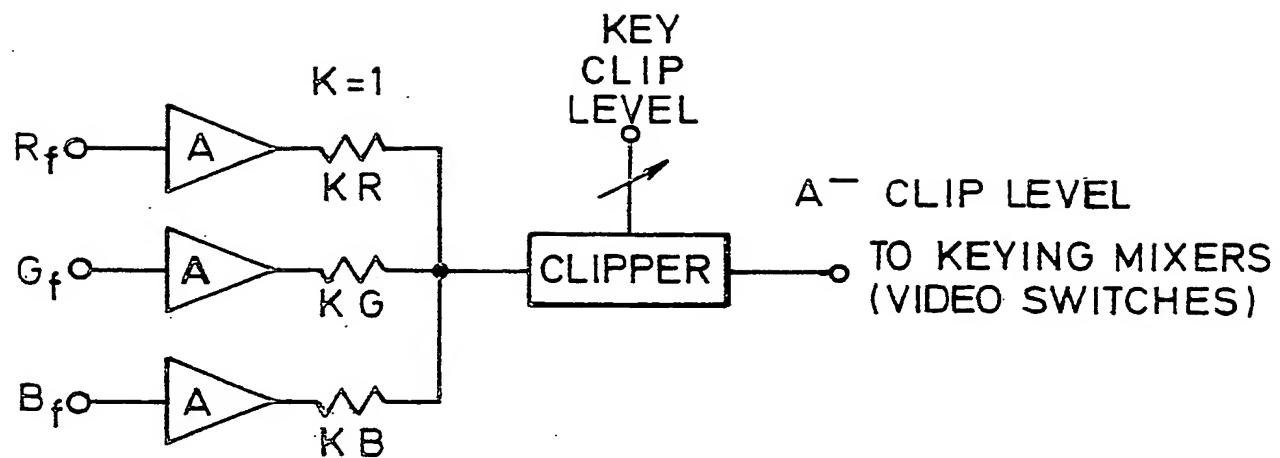
(57) Foreground and background colour video signals are processed to provide separation overlay employing a background and a foreground of different brightness (luminance) levels, the keying signal being derived by clipping through peak luminance signals obtained by summing the R, G and B signals.



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SPECIFICATION

Separation overlay

5 This invention relates to a method and apparatus for separation overlay in the field of video signal processing, also known as "chromakey" or "travelling matte". The term "separation overlay" will be used herein to refer to all such techniques of processing

10 video signals in the television and video fields.

In the conventional chromakey process the subject is positioned in front of a backcloth or cyclorama which is highly saturated in a particular colour. This colour is chosen to be as far removed as possible from those hues present in the foreground subject, blue being commonly used since it is readily distinguishable from flesh tones. The function of chromakey apparatus is then to detect those portions of the signal which are highly saturated in the keying colour and to replace those portions electronically by substitute background scenery.

For example the derived keying signal from a blue background may be obtained by clipping through a B-Y signal or through a B vector signal produced by a

25 non-additive mixer (NAM): i.e. $B_v = B - (RNAMG)$.

This technique has disadvantages such as

a) colour fringeing of the foreground objects

b) careful lighting of the foreground and coloured background is required to ensure even clipping levels

30 c) normally, the technique can only be used indoors because of the difficulty of constructing screens etc. outdoors

d) the foreground object must not contain the keying colour chosen since this would generate a keying signal and hence cause print through of the key background picture.

35 It is an object of the present invention to provide a separation overlay method and apparatus which can obviate or mitigate the aforementioned disadvantages.

According to a first aspect of the present invention there is provided a method of processing foreground and background colour video signals to provide separation overlay which method comprises employing a background and a foreground of different brightness (luminance) levels, the keying signal being derived by clipping through peak luminance signals obtained by summing the R, G and B signals.

Preferably equal R, G and B signals are used, i.e. a white or near white background, having a luminance greater than any white or near white in the foreground. The keying signal would thus be derived by clipping through the peak white obtained by summing the R, G and B signals. It is not however essential that equal proportions of R, G and B be employed. For example the sky could be used as the background or, if it was wished to reduce noise then a background having an increased proportion of G could be used. Moreover pure R, G and B signals need not be used; an encoded e.g. (PAL, NTSC or SECAM) signal may be employed with keying dependent upon the luminance signal Y. It is not to be noted that the luminance signal

Y is itself a summation of R, G and B signals although in proportions R:G:B of approximately 30:60:10.

65 Preferably the background signal has a greater luminance than the foreground signal; it is possible however for the foreground to have a greater luminance than the background e.g. for the background to be black. It is not however the intention of the present invention to include within its scope the brightness separation overlay techniques for monochrome television purposes which are described by A. J. Mitchell in "A personal history of Video Effects in the BBC", International Broadcast Engineer, September 1980, pp 75 6,7.

The method of the present invention eliminates colour fringeing when white is used. There may be some white-fringeing (which is of itself less objectionable than colour fringeing) but such fringeing can if desired be further minimized by use of appropriate signal delay circuitry to narrow the width of the transition zone from foreground to background and/or vice versa.

The invention also has the advantage that less careful lighting of foreground and background is required, it being possible merely to rely upon e.g. the background always being brighter than the foreground. Moreover the method can be used outdoors with e.g. natural objects such as the sky as the background, e.g. by ensuring that the background sum of R, G and B is always greater than the foreground sum of R, G and B. Additionally no print through will occur if the same difference criterion is adopted; also, the signal to noise ratio of the keying signal derived from the summed R, G, B signals will be better than that derived from eg a single blue colour, thus resulting in cleaner keying (switching) edges.

According to a further aspect of the present invention there is provided apparatus for processing foreground and background colour video signals which apparatus includes means for additively mixing the R, G and B signals and means for clipping said mixed signal as a function of its brightness to produce a keying signal.

105 An embodiment of apparatus according to the present invention will now be described, by way of example only, by reference to the accompanying fragmentary circuit diagram wherein separate R, G and B signals R_r , G_r and B_r are amplified by respective amplifiers A and after attenuation through respective resistances K_R , K_G and K_B are mixed in equal proportions and passed to a clipper unit provided with an adjustable key clipping level.

The signal output from the clipper unit is passed to keying mixer circuitry such as is conventionally used in chromakeying or to such circuitry as is shown and described in our copending Patent Application 8523128, filed 19th September 1985 (Serial No 2168564A) claiming priority from Patent Application 8423654, filed 19th September 1984.

120 It will be appreciated that the method and apparatus of this invention may be embodied other than as has been described and hence the invention includes within its scope all such changes and modifications

thereto as would be apparent to one skilled in the art.
CLAIMS

1. A method of processing foreground and background colour video signals to provide separation overlay which method comprises employing a background and a foreground of different brightness (luminance) levels, the keying signal being derived by clipping through peak luminance signals obtained by summing the R, G and B signals.
2. A method according to claim 1, wherein there are used as said background colour video signals R, G and B signals which are substantially equal such as to have a luminance greater than any white or near white in the foreground.
3. A method according to claim 2, wherein said keying signal is derived by clipping through the peak white obtained by summing the R, G and B signals.
4. A method according to claim 1, wherein said background signals R, G and B are unequal.
5. A method according to claim 1, wherein said keying signal is dependent upon the luminance signal Y.
6. A method according to any of claims 1 to 5, wherein said background signal has a greater luminance than the foreground signal.
7. A method according to any of claims 1 to 6, wherein said foreground signal has a greater luminance than the background signal.
8. A method of processing foreground and background colour video signals to provide separation overlay, substantially as hereinbefore described with reference to the accompanying drawing.
9. Apparatus for processing foreground and background colour video signals which apparatus includes means for additively mixing the R, G and B signals and means for clipping said mixed signal as a function of its brightness to produce a keying signal.
10. The features hereinbefore described, or their equivalents, in any novel selection.